DOCUMENT RESUME

ED 209 634 CS 006 340

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TITLE The Effects of Spelling Change on the Adult Reader.
PUB DATE 81
NOTE 38p.; Paper presented at the Annual Meeting of the International Conference on Reading and Spelling (3rd, Edinburgh, Scotland, July 31-August 3, 1981).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adoption (Ideas); Adults; *Change Strategies; *Orthographic Symbols; *Reading Research; *Spelling; Spelling Instruction
IDENTIFIERS *Spelling Reform

ABSTRACT

Two new spelling systems, Regular Spelling (RS) and World English Spelling (WES), were tested for their effects on 26 adults. The subjects read passages in one of these new orthographies, timed themselves, completed a comprehension test, and rated the ease of learning to spell and to read the new orthography in relation to traditional orthography. It was found that WES, a phonetic system, impaired the reading rates of adults; but RS, a system uniformly applying the most frequent of existing spelling rules, only impaired reading in the initial stages of the experiment. After reading about 6,000 words of text, the impairment in reading rates in RS had disappeared. By the end of the experiment, spelling in both systems had not been completely mastered by subjects, but this was probably because the teaching of the spelling of the orthographies was treated as secondary within the experiment. (RL)

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ED209634

The Effects of Spelling Change on the Adult Reader

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Running head: Effects of Spelling Change on Adults

The present system of English spelling produces difficulties when learning to read. One solution to this problem would be to reduce or eliminate the irregularities within the English spelling system. However, although this would undoubtedly make learning to read an easier process, the problem would be that the rest of the population, who are accustomed to reading in traditional spelling, would have problems with trying to learn a new system of spelling. The present paper is concerned with finding out how well two groups of adults each learn a different regular spelling system. The capabilities of the adult learning a new scheme is a problem that has not been approached seriously, and so far, very little experimental work has been undertaken on this subject.

Let us first briefly examine other attempted solutions to help children overcome the irregularities of traditional orthography (t.o.). All these solutions have been designed to help children learn to read and to spell in t.o. One solution has been to use signalling codes to specify the phoneme that a letter represents. For instance, Gattegno (1962) has suggested the use of color coding whilst Fry (1967) has proposed the use of diacritics. Another solution has been to propose simplified and regularised alphabets that usually disregard most letters of the alphabet and create a new alphabet that is almost entirely phonetic. Examples of such schemes are Paulsen's Torskript (Paulsen, 1971) and Malone's UNIFON alphabet (Ratz, 1966). The third category of solution has been the creation of a transitional alphabet that retains

as much similarity as possible to t.o. The best known example of such a system is the initial teaching alphabet (i.t.a.) devised by Sir James Pitman (1961) and researched initially by John Downing. All these main solutions involve the child in learning a new reading scheme, or medium, at the outset and then transferring at the appropriate time to t.o. In the case of the i.t.a. scheme, the research work appears to be encouraging. For example, Warburton and Southgate (1969) reviewed all the 17 published researches up to 1969 on the i.t.a. scheme and made favorable conclusions. Although none of the experiments had been well controlled and none was sophisticated in statistical analyses, all the results showed that children learning in i.t.a , "learned to read earlier, more easily and at a faster rate than similar children using t.o.". But after three years of schooling the level of reading was the same for both the i.t.a. and t.o. children. Warburton and Southgate also conclude that the evidence is equivocal whether or not there is a problem in transferring from i.t.a. to t.o.

The experimental studies on the i.t.a. scheme are interesting because they clearly show the impediments of the present t.o. For instance, Downing (1967) found that after 2 1/3 years, twice as many i.t.a. children as t.o. children had completed the reading scheme; in other words, 52% of the i.t.a. sample had completed the scheme, compared with 25% of the t.o. sample. Thus, it may be concluded that t.o. is retarding children's progress in spelling.

It would be premature to conclude that the various spelling mediums used for the teaching of reading are of little use because eventually, children taught in a new spelling system are not better readers after about three years than those who are taught in t.o. from the beginning. However, it is tempting to conclude that this eventual equalization of the two groups which has been found so far is entirely due to the children taught in the new medium being retarded by their having to transfer to t.o. Eventually the children taught in t.o. from the beginning catch up. This leads us to the proposal that a change to make the t.o. system more regular would mean that this retarding element would be removed. Children would learn to read more quickly and easily and the incidence of permanent reading problems would reduce. But of course, such a change would not be easy, otherwise t.o. would have been changed long ago. One major problem would be the unwillingness of adults to change over to a new system due to inertia and a reluctance to relinquish traditional spelling. But leaving this problem aside, what would be the rate of progress of adults learning a new spelling scheme in terms of their spelling and reading ability in the new scheme? The present study is aimed at studying this and other questions.

The two spelling schemes chosen for this study were Regular Spelling (RS), invented by Beech (1980) and World English Spelling (WES). The RS system was devised with three criteria in mind. The first criterion was that the system of regularization should enable children to learn to read more easily. Second, adults should find it easy to read, so there would have to be a close resemblance with t.o. Third, it should be easy to spell in the new system, thus the number of spelling rules should be reasonably small. The problem is to devise a system that is able to balance between this triumvirate of criteria. For example, the Regularized Inglish system of Axel Wijk (1959) satisfies the second criterion (that adults should find it easy to read) quite well, equally as well in fact as the RS system, but it fails on the third criterion (that it should be easy to spell) because of the very considerable number of spelling rules that have to be memorized. Approaching the other extreme are systems like i.t.a. which satisfy the third criterion, because they have reasonably few spelling rules, but do not appear to satisfy the second criterion, because the text appears to be radically different from t.o. to the adult reader familiar with t.o. In order to satisfy this balance, the RS system was devised using several guidelines which have been outlined elsewhere (see Beech, 1980). Briefly, these include the following: first, where several symbols or combinations of symbols

represent the same sound, the rule most frequently used is adopted, bearing in mind the position of the sound in the word. For example in t.o., the spelling ou most frequently represents the ow sound in the middle of the word (as in 'loud'), but ow represents the same sound at the end of the word (e.g. 'cow'). Second, subtle distinctions in sounds already ignored in t.o. are also ignored in RS. For example 'is' and 'result' remain unchanged, instead of being spelled with z in place of s. Third, in cases where the frequency of a sound in a word position is low, an easier to learn spelling combination is substituted. For example u-e is used to represent the long u sound (e.g. 'tune') but this sound is most frequently represented by ew at the end of the word. In the case of RS, all words ending in this sound end in -u. Furthermore in this particular case, suppose I had decided to end all words in -ew, this would have resulted in strange spelling constructions such as continew (instead of continu which is the RS spelling). An example of some text in RS is given in the appendix. I have since made some slight amendments to the RS system, basically bringing it closer to t.o., and these are described in the method section. Tests on the RS system revealed that approximately 70% of text remained unchanged, whereas the number of spelling rules was reasonably small, but not so small as those in systems such as WES.

The WES system was chosen for comparison mainly because it has been strongly advocated by the Simplified Spelling Association to replace t.o. In addition, WES is similar to the i.t.a. spelling system, so it may be assumed that

children would find it very easy to learn to read in this medium. Thus WES is an almost completely phonetic system, but unlike i.t.a. it uses only the Roman alphabet. An example of text in WES is as follows: "... or eni naeshon soe konseevd and soe dedikaeted, kan long enduer". As mentioned previously, although it satisfies the criterion that it can be read easily by children and that it is (presumably) easy to spell for children and adults, it may well be difficult for adults who are used to t.o. to learn to read. The extent of this difficulty is investigated in the experiment.

The method used in this experiment was to teach one group of adults the RS system and the other group the WES system. Both groups were given successive passages to read in one of these new orthographies. The passages were long extracts, in sequence, from one book. After each extract there was a comprehension test of that section and a spelling test of the new orthography. Subjects also timed themselves for reading each extract in order that reading speeds could be calculated later by the experimenter. The advantage of this method was that subjects could read the kind of materials they would normally read and become well acquainted with the orthography. Furthermore, the comprehension tests and the context of the story in the book ensured that they were reading for meaning and were not concentrating too hard on the new spelling. Thus, the change in orthography, although an impediment to reading in the initial stages, may well be processed automatically with experience. A cautionary note

should be made at this point that university students were used in the experiment so that performance must not be considered as representative of the whole adult population. However students are probably representative of anyone who reads a substantial amount of material on a regular basis, and thus are representative of that sector of the population most likely to be affected by a change in the present orthography.

Method

Subjects

The subjects were university students participating in a second year practical class; their ages ranged from 19 to 43 years. The subjects were divided into two groups which were balanced as far as possible according to sex and to their average grades in examination at the end of their first year at university. There were 7 males and 6 females within each group.

Materials

The two spelling systems. The RS system which has been described in detail by Beech (1980), has been amended in a minor way by its deviser. Although not previously named as the RS system, this name has been given to the system as it now stands in its amended form. The amendments are as follows:

1. The k sound. Previously, the k sound was always represented by 'c'. Now it is represented by 'c' except at the end of the word where 'k' is used, although the grapheme 'c'

continues to represent the k sound when the k sound is preceded by a short vowel sound. Here are some examples of spelling in RS: milk, crank, seek, take, took, sinic, nec.

2. The long e sound. In the new version of RS this is represented by 'ee' (e.g. sleep), except when the spelling in t.o. is 'ea' (e.g. meat). In the case in which the grapheme 'e' in a word spelt in RS has more than one letter between itself and the end of the word, the e sound is spelt just as 'e' (e.g. feld for 'field', equal). However, when the word ends in ch, st or th, then 'ee' or 'ea' is still used (e.g. teach, east, teeth). When a word ends in the ee sound, it is spelt as '-e' when preceded by only one consonant or sh e.g. be, ce ('key'), he and she. In all other cases the ending is '-ee' (e.g. plee, tree).

3. The s and z sounds. In the original version of RS these sounds were spelled with an 's' except for the z sound at the beginning of the word (e.g. zip). In the amended version, when the word ends in '-ess' in t.o. this spelling is retained (e.g. stress). The following '-ce' spellings are used at the end of the word for the s sound:

-ance (e.g. dance)	-ace (e.g. pace)	-eece (e.g. fleece)
-ence (e.g. hence)	-ice (e.g. dice)	-eace (e.g. peace)
-ince (e.g. mince)	-oce (e.g. doce for 'dose')	
-once (e.g. sconce)	-uce (e.g. puce)	
-unce (e.g. dunce)	-ooce (e.g. jooce for 'juice')	

If the word ends in a z sound, s is used and not the '-ce' ending (e.g. dose ('doze'), muse, wise). The z sound continues to be spelled with 'z' at the beginning of the word.

4. -sion and -tion endings. The shun and chun sound endings are still spelled '-tion' but the zhun sound ending is now spelled -sion (e.g. fusion, division).

5. -ower ending. This is now spelled 'our' (e.g. pour for 'power') instead of 'ouer' which was the previous version of RS.

6. al- beginning. This is now spelled as in t.o., for instance, also, altogether, altho.

The WES system is the same as that described in Dewey (1971).

The booklets

Two booklets were prepared, one for each group, explaining how to spell in their respective orthographies. The WES system was described by giving the name of each sound followed by examples. This was followed by explanatory notes on the following: The use of the dot to separate successive letters which otherwise might be read as another combination, the distinctions between aa and ar, between thh and th, between au and or, between uu and oo, and between er and ur. After each explanation of the system there was a self-spelling test of 32 questions with the answers upside down for the subject to check himself. The RS system was described in a similar manner to Beech (1980) except that more examples were given after each rule. As in the case of the WES explanatory booklet, there was a self-test of 37 aspects of the RS system. The answers were provided upside down below the test so that the learners could check their answers. The booklet explaining the RS system was approximately three times as long in length.

A total of eight additional booklets was prepared for each group. Each booklet contained a passage of text of approximately 1400 words taken from Vera Brittain's 'Testament of Youth'. Two of these booklets had the passages written in t.o. and the other six were in the new orthography. Those written in t.o. were reasonably self-contained extracts taken from later parts in the novel and unlikely to influence the subject's grasp of the meaning of the other six parts. The six extracts in the new orthography were identical in content for both groups and were taken in sequence from the earlier part of the book. Some parts of the text were edited so that there could be a reasonably self-contained story within each extract. Each passage began with the instruction to start the timer, and similarly at the end of the passage there was the instruction to stop the timer and to write down the time taken to read the passage. Table 1 shows the number of words remaining unchanged in the passages when converted to the new systems.

(Insert Table 1 about here)

On the next page was a comprehension test consisting of 12 statements each of which had to be marked as either 'true' or 'false'. For instance, "My father was very fond of music TRUE/FALSE" or "I wrote five novels before I was eleven years of age TRUE/FALSE". All instructions and questions were in the new orthography except for the booklets with passages in t.o. The comprehension test was followed by a spelling test only for the booklets in the new orthography. Each spelling test consisted of 32 questions for the WES group and 37 questions for the RS group. In this test a word was given in t.o.

followed by a blank in which the subject had to write the word as it would be written in the new spelling system. Each question was designed to test one aspect of the new orthography. For instance, for the WES group one question in each booklet always tested the use of the dot rule. Thus, each aspect of the orthography was tested on six successive occasions in the six spelling tests at the end of each booklet in the new orthography. Of course, the tests of each rule involved not only instances when a rule would be applied, but also instances when a rule would not be applied.

The typing up of these passages afforded the opportunity for a miniature experiment. The typist (J.B.) timed herself while typing the passages, copying from neat handwritten versions of the passages. The timer was stopped whenever a mistake occurred and restarted after the mistake had been corrected. All the RS passages were typed in sequence from Trial 1 to Trial 6 and similarly, the WES passages were typed in sequence. Table 2 illustrates the typing rate across trials. It should be remembered that the words in the passages are

(Insert Table 2 about here)

exactly the same when comparing, say, the RS passage for Trial 1 with the WES passage for the same trial. It can be seen that there was no systematic improvement in typing speed, but the typing rate was faster in all trials for the passages spelled in RS except for Trial 4, in which the typing speed was the same. The typing speed in RS was approximately the same as in t.o. Thus, it would seem that the motor patterns established by an experienced typist are not impaired when typing RS. This

is probably because of the predominant use of spelling combinations in RS which are of high frequency. By contrast, WES has new patterns of spelling combinations which require the learning of new motor patterns by the typist.

Procedure

At the beginning of the experiment the subjects were told that they were to imagine that the country had suddenly changed over to a new system of spelling. They were then given a brief summary of what the experiment involved so that they would know what to expect at each stage. Booklets were handed out with a passage in t.o. followed by a comprehension test. The subjects were each given a timer and practised using it. They were told beforehand how the comprehension test would be marked, that is, +1 if correct, -1 if not correct and 0 if not attempted. (Thus the marking scheme corrected for chance). They were instructed to read the passage at their normal reading rate. After this task was completed by all subjects, they were split into two groups. The author took the RS group for the remainder of their session and his wife (J.B.) and postgraduate student (R.M.) took the WES group for the rest of their session.

Each group was then given a spelling test in t.o. of all the words subsequently to be tested in the spelling tests in the new orthographies. The subjects were not told that they would later encounter these words in the spelling tests. Then they were given the explanatory booklet about the new spelling scheme. When they were satisfied that they knew the system reasonably well, on the basis of self-spelling test, they

started on the test booklets in the new orthography. The first booklet in the new orthography constituted the first trial and each subsequent trial was undergone using a new booklet containing a new passage with tests. They had to keep the explanatory booklets at the front with the experimenter while undergoing each trial. At the end of each trial they brought their booklet to the experimenter and the spelling test part of the booklet was marked in front of them. They were encouraged to consult the explanatory booklet to clarify points, if necessary, before continuing with the next trial. After the sixth trial, subjects were given the final booklet which was a passage in traditional orthography followed by a comprehension test. Finally, they were given a questionnaire about the scheme. The whole session was quite long, but subjects were encouraged to take breaks. Most finished after about 3 or 4 hours and the maximum time was about 5 hours, for both groups. In some cases, subjects took the booklet for the sixth trial and subsequent material home with them to complete that evening.

Questionnaire on the new orthography

In the first section of the questionnaire at the end of the experiment, subjects were required to rate the ease of learning to spell in and then the ease of learning to read the new orthography in relation to t.o. All the ratings in this questionnaire were made by ticking a line representing the rating scale. The analysis involved dividing each line into a ten-point scale with zero representing one extreme

and 10 representing the other. Thus a mark made exactly half-way along the scale would be scored as 5. In these first two ratings, zero represented "much more difficult than traditional spelling" and 10 represented "much easier than traditional spelling". Subjects were also asked the following: "Given that if (WES/RS) were adopted in the U.K., children could learn to read and spell more quickly and easily, saving at least a year and greatly reducing the drudgery of the school, do you think personally that we should change over to this new spelling system? (yes, no or undecided)". Obviously, this question is not framed in an unbiased manner, but up to this point in the experiment no reason for changing over to a new spelling system had been put forward, so these reasons were incorporated into the question. The case against spelling reform would have been apparent to the subject who had at first hand encountered the difficulty of learning a new spelling system. Subjects were then asked if they were already used to reading and writing in the new system. In the final part of the first section, the subjects were invited to make comments about the system.

In the second section of the questionnaire, all the aspects of the rules in the new orthography which had previously been tested by the spelling tests were individually rated for spelling difficulty and then for reading difficulty with "very easy" on one pole (scoring zero) and "very hard" on the other (scoring ten).

The third section asked the subjects if they had previously read Vera Brittain's book and if so, when. A television series

of the book had been shown about a year earlier, but there was a considerable difference between the television version and the much more detailed accounts within the book. Subjects were asked if they had seen this series. Finally, they were asked: "If you have read the book or seen the television program, did it help you in this experiment? If so, please expand".

Results and Discussion

The reading rates of individual subjects were computed and then converted to percentages of their individual reading rates of traditional orthography. These latter rates were computed from the mean rates of the passages in t.o. read before and after the main block of trials. Because subjects occasionally forgot to time themselves after a passage, some data were missing within each 2-dimensional matrix (subjects by trials) of data for reading rates. Each missing cell was replaced by the mean of the column and row of data to which that particular cell belonged. This amounted to 2.6% and 6.4% missing data in the RS and WES groups respectively.

The reading rates, expressed as percentages of normal reading rates are illustrated in Figure 1. It can be seen that the RS group were reading much faster than the WES group

(Insert Figure 1 about here)

and this was confirmed by analysis of variance. A 2 x 6 analysis of variance with the first factor, groups, between subjects and the second factor, trials, within subjects, produced a main effect between the RS and WES groups, F (1,24) = 14.0; $p < .01$, but the trials factor only approached significance, F (5,120) =

2.16; .05 < p < .10. The interaction was not significant. The lack of significant main effect for trials was undoubtedly due to the inclusion of the sixth trial. When this trial was excluded in a regression analysis, there was a significant difference in the slopes of the reading rate functions of the RS and WES groups, F (1,126) = 4.05 p < .05. There was also a significant difference in intercepts, F (1,127) = 18.3; p < .001, confirming the only significant main effect found in the analysis of variance. The slope of the function of the RS group demonstrated a 16.7% improvement in performance on each trial, whereas in the case of the WES group the improvement was only 2.5%. Thus, the RS group improved in their rate of reading text spelled in Regular Spelling until they reached rates equivalent to their normal rate of reading in traditional spelling. By contrast, the WES group, improved only slowly and never approached normal reading speeds.

The performance of subjects on the comprehension tests taken after each trial is illustrated in Figure 2. This figure

(Insert Figure 2 about here)

shows that performance at all times for both groups was equal to or above that on traditional orthography. A 2 x 6 analysis of variance on groups and trials, respectively, produced a significant main effect only on trials, F (5,120) = 3.5; p < .01. Generally, reading rates and comprehension levels should be examined in conjunction with one another, as there could be a reciprocal relationship between the two. An improvement in reading rate can be at the expense of comprehension. However, the present results demonstrate that the significantly better performance of the RS group on reading speed compared with the

WES group was not due to any loss in performance on the comprehension test. There are fluctuations in the level of comprehension and one might conclude that the improvement in reading speed was due to a deterioration in comprehension performance. But the deterioration in comprehension is a step function with performance on the first three trials about the same and then there is a fall in the last three trials. The improvement in reading speed performance does not demonstrate the same characteristic for either the RS or the WES group.

In the spelling tests only the spelling combination pertaining to each rule being investigated for each word was scored. The performance of both groups on the spelling tests was broadly similar at approximately 65% correct and 57% correct for the RS and WES groups, respectively. In this case strict comparisons may not be made between the two systems because the materials used were different as they were designed to test the particular rules of each test. We may conclude, however, that neither group had attained complete mastery of its respective system. One way analyses of variance revealed significant main effects across trials, F (5,60) = 8.11; $p < .001$, and F (5,60) = 3.85; $p < .01$ for the RS and WES groups respectively, but the improvement across trials was not particularly systematic.

Apart from measures of reading speed, comprehension score and spelling scores in the new and traditional spelling schemes, other measures were collected from subjects via the questionnaires. All these measures were intercorrelated and the resulting

matrices are shown in Table 3, for the RS group, and Table 4 for the WES group. As there were 13 subjects in each group, this produced 13 means for the purposes of computing each measure in each table. The tables are also useful in demonstrating the means of each measure. For example, it will be

(Insert Tables 3 and 4 about here)

noted that reading speeds in t.o. were similar in both groups, but that the comprehension level in the WES group for the t.o. texts was approximately 30% better. However this was allowed for in the previous analyses of performance on the spelling schemes, as these performance levels were expressed as percentages of performance on the subjects' respective t.o. spelling schemes. The 4th and 5th measures in each table were derived by taking the mean of all the individual ratings of each spelling rule for each subject. Measures 6 and 7 in each table refer to the one rating each subject gave about his entire spelling scheme at the beginning of the questionnaire on the ease of spelling and reading, respectively. Only one correlation was common to both groups and this was between the rating of individual rules for spelling ease and reading ease, but this may have just been because each rule had the two rating scales next to each other and the first rating would influence the second.

A more interesting result in Table 3 was a correlation of .70 between the subjects' spelling score in RS and their score in t.o. This correlation demonstrates that if one has a firm grasp of the main rules of spelling in t.o., one will be good at spelling in RS. By contrast, in the case of the WES group,

the correlation was -.08 showing that a knowledge of the spelling structure in t.o. was of no help in learning WES. Another reason for this result could be that if subjects were in doubt about spelling a word, they spelt it in t.o., and as more words in RS are similar to t.o., they were more likely to be correct.

The third and final significant correlation in Table 3 was between reading speed in t.o. and the comprehension score in t.o., $\underline{r}$ = .67. If subjects were faster at reading the text they were also better at understanding it, so there was no speed trade-off with comprehension. In the WES group, there was no similar association between these measures, $\underline{r}$ = -.08.

There was a correlation which was almost common to both groups in that in the WES group, the correlation was .72 and in the RS group between the same two measures it was .54 (tabulated value .55 at the 5% level). This correlation was between reading speed in one spelling scheme and that in traditional spelling. This is not an unexpected result; it demonstrates that the reading habits in traditional orthography continue over to reading in other spelling schemes. Perhaps one would have expected a stronger association with the RS group as the text is more similar to t.o.

There were two remaining correlations in the WES group, shown in Table 4, that were not found in the RS group. First, there was a significant correlation between the comprehension scores in WES and those in t.o., $\underline{r}$ = .69, but not for the RS group, $\underline{r}$ = .04. Second, there was a significant correlation between the comprehension scores in WES and the one rating that subjects gave to the entire system for reading ease, $\underline{r}$ = .56, but in the case of the RS group the correlation was only .29.

The individual spelling tests and ratings of each spelling rule were collapsed across subjects for each group. These measures, along with the percentages of words in the tests of each spelling rule remaining the same as in t.o., were intercorrelated and are shown in Tables 5 and 6 for the RS and WES groups, respectively. In both groups, the first three

(Insert Tables 5 and 6 about here)

measures were all significantly correlated with each other. Thus the subjects were able to judge the difficulty of the spelling rules according to their own earlier performance on the spelling tests. The fourth measure produced only one significant correlation and this low correlation was only in the RS group. The same correlation in the WES group just failed to reach significance (tabulated value, $r = .32$ at the 5% level). This shows that there is a slight tendency for subjects to spell a word as it would be spelled in t.o., hence if a rule tends to be spelled in the same way as in t.o. (the tables reveal that this is 57% of the time in RS and 30% the time in WES), there is a tendency for it to be spelled correctly.

General opinion on the new orthographies

In section one of the questionnaire, subjects were asked various questions about their opinions on the new orthography that they had just learned. In the RS group, 8 of the 13 subjects responded that they were used to reading in RS, however, all but one of the subjects indicated that they were not used to writing in the system. In the case of the WES

group, 4 out of 13 indicated they were used to reading and 1 out of 13 that he was used to writing in the scheme. When asked if a change-over to spelling in the new system should be made, in the RS group, 4 responded 'yes', 4 were 'undecided' and 5 indicated 'no'. Similarly in the WES group, 3 responded 'yes', 6 were 'undecided' and 4 responded 'no'. So neither group was enthusiastic about spelling reform, as altogether only 27% were in favor of reform. Subjects were invited to comment on the scheme. In the RS group only four subjects wrote comments. Two people made the point that changing the spelling system would make English easier for foreigners. The rest of the points were only made by one person for each point. The other favorable comment was that it would help those with spelling difficulties. The unfavorable comments mainly concerned the need to know how words were correctly pronounced. One comment was that the system favored those in the South East of England because it was based on received pronunciation, and another comment was that it would develop a more uniform way of speaking. One subject wrote: "There should not be so many rules regarding regular spelling. This is tedious and is very like the rules which apply to the English language in general, especially with regard to the grammar part". In the WES group, twice as many subjects made comments. Five people commented on the problem that one has to know the correct pronunciation of a word when spelling in WES. Other unfavorable comments were that spelling was difficult (two subjects) and that reading was difficult (two subjects). One of these latter subjects wrote that it "Feels a bit like reading Chaucer" and the other wrote that as an

adult, it was difficult to adjust to. Two people mentioned the problem of restocking books. There were two favorable comments, each made by a different person: It made English easier to learn for foreigners and it was useful for slow learners.

In the third section of the questionnaire, subjects were asked if they had read the book 'Testament of Youth' or seen the television programs about it. In the RS group, two had seen the television programs and one of these two had read the book about 1½ years ago; this subject wrote that she had been slightly helped by this. In the WES group, none of the subjects had seen the programs or read the book.

Conclusions

Intuitively, one would expect that reading in a spelling system which produces a substantial disruption to traditional spelling would be more difficult. The experiment has certainly borne this out with the reading speeds in WES being substantially less than those in RS. What was not expected, however, was that by only the fourth trial, that is, after reading approximately 5,800 words in the new system, subjects in the RS group were reading at about the same rate as they did in traditional spelling. So even though approximately 30% of words had been changed relative to t.o., with a relatively small amount of practice, subjects had adjusted to the new orthography. Comprehension levels did not suffer as a result of changing to these orthographies.

A different picture emerges on the output side. When subjects are required to spell in the new orthographies, they spell incorrectly approximately 40% of the words testing various rules. However, the spelling tests were stringent, as they were deliberately testing the subjects' knowledge of certain rules. If they had been given a dictation test of connected discourse, the errors would probably reduce as the difficult rules do not occur very frequently. Furthermore the emphasis of the experiment was mainly on subjects developing a skill in reading the new system rather than spelling in it. Still on the subject of output, a small experiment on one subject revealed that typing rates are not impaired when typing in RS, but they are impaired when typing in WES. It was suggested that as RS adopts the most frequent spelling rules for particular word positions, the well-learned motor patterns of the experienced typist are not impaired by the changes that the RS system makes.

What are the implications of this experiment for the proposal to permanently change t.o.? The first positive conclusion we can make is that a phonetic system such as WES is too drastic in its disruption to serve as a candidate for spelling reform, although it probably would be adequate as a teaching medium for children learning to read. As for RS, it did meet the criterion of being easy to read (and also to type). The problem was that proficiency in spelling was not good. It is interesting to note that the spelling rules in WES were rather less than in RS and yet the levels of performance in the two groups were approximately the same. It must be added that as the tests were different for each

scheme, comparisons between absolute levels should not be made. Although spelling performance was not good in this experiment, the following points should be noted. First, the main emphasis in the experiment was on reading the passages to understand the content, as the subjects would normally. Consequently, subjects did not use much of their time for actually learning the spelling schemes. One subject made the same point in her comments on her questionnaire. Second, all the rules in RS were presented together. Performance may have been enhanced if the learning had been broken down into stages throughout the experimental session. Unfortunately this would have been at cross-purposes with the main experimental design. In conclusion, considering that subjects only had one afternoon to learn the system, performance was excellent on reading but not in spelling. Further work is needed to find out how easy it is to learn to spell in RS in an experiment in which spelling is given precedence. Given that adults can cope with the RS system and that children would learn to read much more easily in the system, it would seem that there is a good case to be made for changing our present spelling system to one along the lines of RS.

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APPENDIX

Lincoln's Gettysburg Address in Regular Spelling

Forscor and seven years ago our fathers brort forth on this continent a nu nation, conseeved in liberty, and dedicated to the proposition that all men ar created equal.

Now we ar engajed in a grate sivil wor, testing wether that nation, or eny nation so conseeved and so dedicated, can long endure. We ar met on a grate batal-feld of that wor. We hav cum to dedicate a portion of that feld as a final resting place for those who heer gave there lives that that nation mite liv. It is altogether fiting and proper that we shud doo this.

But in a larjer sence, we cannot dedicate -- we cannot consicrate -- we cannot halo -- this ground. The brave men, living and ded, who strugaled heer, hav consicrated it far abuv our poor pour to ad or ditract. The werld wil lital note, nor long rimember wot we say heer, but it can never forget wot thay did heer. It is for us, the living, rather, to be dedicated heer to the unfinished werk wich thay who fort heer hav thus far so nobaly advanced. It is rather for us to be dedicated to the grate task rimaning befor us -- that from thees onored ded we take increaced divotion to that cors for wich thay gave the last ful mesure of divotion; that we heer hyly risolv that thees ded shal not have died in vane; that this nation, under God, shal hav a nu berth of freedom; and that guvement of the pepal, by the pepal, for the pepal, shal not perish from the erth.

Table 1. -- Percentage of Words in Passages remaining unchanged

Spelling system	The trial passages 1	2	3	4	5	6	m
RS	69.0	68.6	66.1	71.0	77.0	69.7	70.2
WES	31.8	30.7	33.4	31.3	33.6	34.9	32.6

Table 2. -- Typing Speeds in Words/Minute

Spelling system	The trial passages 1	2	3	4	5	6	m
RS	41.9	37.5	36.8	34.0	40.4	39.5	38.2
WES	32.3	36.5	36.0	34.0	32.5	37.5	34.8
	Two passages in t.o.* 1	2					
t.o.	37.2	37.3					

* The two passages in t.o. were different in content from the passages constituting the six trial passages.

Table 3. -- Pearson Product Moment Correlations, with Decimals Omitted, between Measures from Subjects in the RS Group

Measures for RS	2	3	4	5	6	7	8	9	10	m	s.d.
1. Reading speed	-25	15	-28	00	-34	02	54	16	27	154.6	44.9
2. Comprehension score		13	30	26	17	29	-03	04	-26	57.6	16.2
3. Spelling score			-39	-38	-01	23	-11	00	70**	64.4	6.9
4. Mean of ratings of individual spelling rules for spelling ease				70**	-02	-46	-17	11	-20	3.8	0.9
5. Mean of ratings of individual spelling rules for reading ease					14	-22	26	32	-34	2.5	1.3
6. Rating of spelling ease of entire system						30	-21	-13	-27	2.2	2.0
7. Rating of reading ease of entire system							04	-05	-16	5.0	2.8
Measures for t.o.											
8. Reading speed in t.o.								67*	-20	189.2	44.2
9. Comprehension score in t.o.									-13	52.9	18.4
10. Spelling score in t.o.										94.9	3.3

* $p < .05$ ** $p < .01$ df = 11

Table 4. -- Pearson Product Moment Correlations, with Decimals Omitted, between Measures from Subjects in the WES Group

Measures for WES	2	3	4	5	6	7	8	9	10	m	s.d.
1. Reading speed	-12	14	14	14	-16	-31	72**	-27	29	103.4	31.9
2. Comprehension score		-51	-29	-17	08	56*	11	69**	14	71.9	8.4
3. Spelling score			-06	-35	30	-18	-18	-24	-04	57.2	8.6
4. Mean of ratings of individual spelling rules for spelling ease				60*	-39	-45	-02	07	-32	2.7	1.2
5. Mean of ratings of individual spelling rules for reading ease					-26	-20	18	-12	-09	2.8	1.5
6. Rating of spelling ease of entire system						39	-19	08	04	2.1	1.9
7. Rating of reading ease of entire system							06	47	-36	5.7	2.6
Measures for t.o.											
8. Reading speed in t.o.								-08	07	217.4	79.7
9. Comprehension score in t.o.									-35	67.9	18.3
10. Spelling score in t.o.										95.6	2.2

* $p < .05$ ** $p < .01$ df = 11

Table 5. -- Pearson Product Moment Correlations, with Decimals Omitted, of the Individual Spelling Rules from Subjects in the RS Group

	2	3	4	M	S.D.
1. Percentage correct on spelling test	-54**	-45**	33*	65.2	17.9
2. Ratings of ease of spelling each individual spelling rule		66**	06	3.6	1.4
3. Ratings of ease of reading each individual spelling rule			-29	2.5	0.9
4. Percentage of words in spelling test of each spelling rule remaining the same as in t.o.				56.7	36.2

* $p < .05$ ** $p < .01$ df = 35

Table 6. -- Pearson Product Moment Correlations, with Decimals Omitted, of the Individual Spelling Rules from Subjects in the WES group

	2	3	4	M	S.D.
1. Percentage correct on spelling test	-68**	-58**	31	56.8	20.0
2. Ratings of ease of spelling each individual spelling rule		80**	-30	2.8	0.9
3. Ratings of ease of reading each individual spelling rule			-28	2.3	0.6
4. Percentage of words in spelling test of each spelling rule remaining the same as in t.o.				30.1	33.8

* $p < .05$ ** $p < .01$ df = 30

FIGURE CAPTIONS

Figure 1

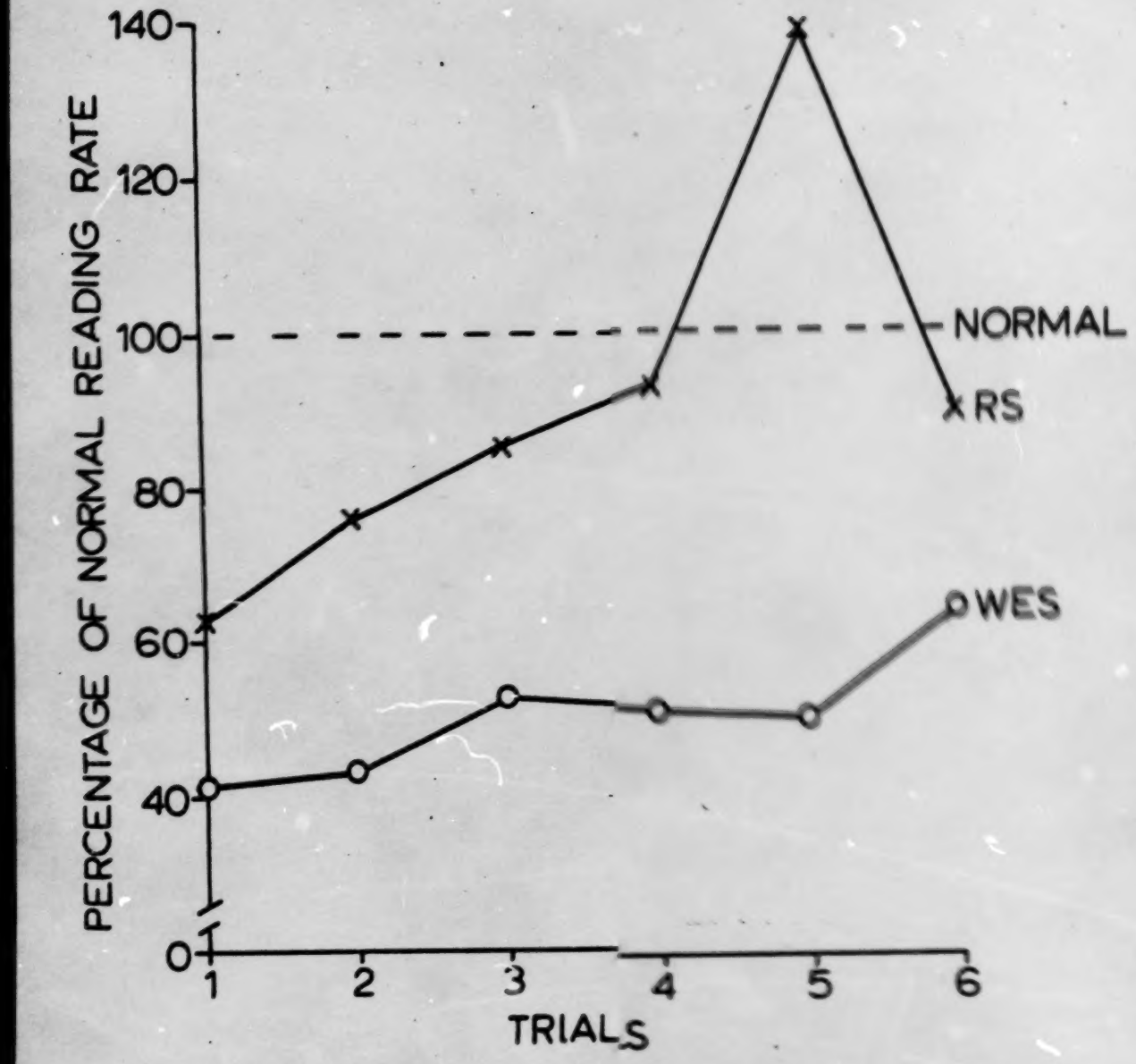
Reading rates in the learned orthography of the RS and WES groups as a function of trials.

Figure 2

Comprehension levels when reading in the learned orthography for the RS and WES groups as a function of trials.

ACKNOWLEDGEMENTS

The author is deeply grateful to his wife, Jenny Beech, for help in the preparation of materials for the experiment and for helping to run subjects. Thanks are also due to Roisin McKeating for help in the running of the experiment.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PERCENTAGE OF NORMAL READING RATE
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WES
1
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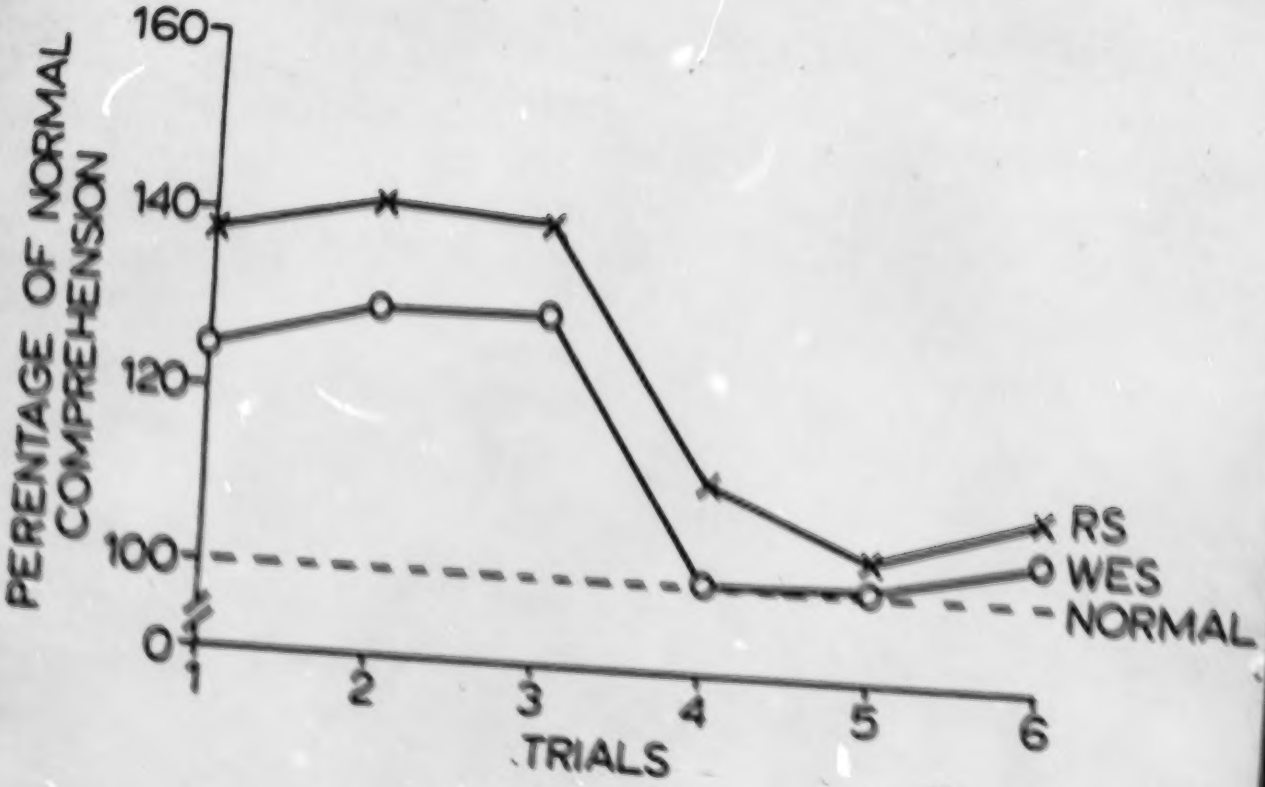
TRIALS


PERENTAGE OF NORMAL COMPREHENSION
160
140
120
100
0
1
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TRIALS
RS
WES
NORMAL